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Editor's note

The resounding success of NUS Enterprise's signature event, Innovfest unbound 2017, was testament to the strong progress we have made in nurturing the entrepreneurial ecosystem. InnovFest Suzhou echoed similar success, and further cemented NUS Enterprise's position as a foremost aggregator and connector for the global start-up community. Bringing together over 11,000 entrepreneurs, investors, corporate and government executives, researchers and academia combined, these events are the places to be when it comes to immersing in innovation and forging new partnerships.

In this installment of Enterprise SPARKS, we also delve into hot topics like ageing challenges, digital disruption in big data, and brand building tips, while the Thought Leadership section focuses on the "gazelles" and "zombies" of Singapore's tech ecosystem. NUS Overseas Colleges students' participation in a NASA Hackathon, insights into hiring and firing, and the new innovations of our start-ups are some of the other reads in this issue, as Enterprise SPARKS continues to beam the sparkling talents, bright ideas and innovations of the NUS entrepreneurial community.



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INNOVFEST UNBOUND 2017: BIGGER, BETTER & A RESOUNDING SUCCESS

Southeast Asia's largest annual innovation festival organised by NUS Enterprise and unbound, as part of Singapore's Smart Nation Innovations Week



Dr. Yossi Vardi (L) and Dr. Lily Chan (R) contributing to the opening remarks for Innovfest unbound 2017, with both of them co-chairing the event



A packed audience at the opening of Innovfest unbound

Highlights:

- 11,000**
Registered Delegates
- 300**
Speakers
- 350**
Exhibition Booths
- 14**
Kopi Chats
- 8**
Urban Experience Partners

Held from 3-4 May at Marina Bay Sands, Innovfest unbound 2017 returned with unprecedented numbers of over 11,000 registered delegates from over 50 countries. With a total of 10 exciting stages, satellite events, and workshops, the annual innovation festival and digital conference gathered not just the Asian and Western community of researchers and academia, corporates, investors, start-ups, policy makers, and media, but also brought new perspectives into the technology and innovation space.

Singapore Minister for Communications and Information Dr. Yaacob Ibrahim graced the opening of the festival as Guest-of-Honour. In his keynote address, Dr. Yaacob outlined the government's push for artificial intelligence (AI) and data science through the establishment of AI.SG and the Singapore Data Science Consortium.

There were also innovation champions such as Taizo Son, Founder, Mistletoe; Dirk Ahlborn, CEO, Hyperloop Transportation Technologies;

Robert Gilby, Managing Director, The Walt Disney Company South East Asia; Mark Adams, SVP Innovation, Vice Media and many others who spoken on the latest developments in the entrepreneurship and innovation space.

At the discussion titled "Why the Government needs Start-ups", the panel dissected the relationship between start-ups and the government. Dr. Lily Chan, CEO of NUS Enterprise and co-chair of Innovfest unbound, highlighted that start-ups are the heart of a



Minister for Communications and Information, Dr. Yaacob Ibrahim, delivering his keynote address



NUS Enterprise MVP Studio at the Start-up Bazaar

vibrant economy. While the government is needed to support and foster start-ups, they, in return, need start-ups to take the risks they cannot afford to. Start-ups may fail – but it is alright to experiment. The same cannot be said about the government who are constantly subjected to merciless public scrutiny. Furthermore, as large corporates are not nimble enough, start-ups are now the ones driving innovation. The Bayer-NUS Grants4Apps Singapore Finals and Awards Ceremony was also held on the first day of Innovfest unbound, with three teams winning not just a SGD 10,000 grant, but also mentorship opportunities, incubation space, and pitch opportunities.



Bayer-NUS Grants4Apps winners were announced, each team walking away with a SGD 10,000 grant

The Start-up Bazaar featured over 350 exhibiting start-ups and pioneering technologies, including over 120 supported by NUS Enterprise such as RateX, Averspace and WaterOAM.

NUS alumnus and CEO of Razer Tan Min-Liang took centre stage and shared his personal insights on building a brand in his talk, “The Cult of Razer”. Having built the highly successful gaming company that produces high-

quality, cutting edge gaming devices from scratch, Min-Liang affirmed that being passionate, sincere and undaunted were key to establishing such a cult brand.

Check out our key takeaways on page 16!



An attendee trying on a headset of one of the start-ups dabbling in Virtual Reality (VR) devices



Prof. Wong Poh Kam delivering his speech at the talk titled “Growth Dynamics of Tech Start-ups in Singapore”

Professor Wong Poh Kam, Director of NUS Entrepreneurship Centre, shared more on his study of Singapore’s start-up eco-system in his talk “Gazelles or Zombies? Growth Dynamics of Tech Start-ups in Singapore”. Prof Wong highlighted that while our start-up scene has become more dynamic over the last decade, Singapore is not producing enough “gazelles”, citing recruiting key talent, a small domestic market and dependence on major customers as challenges. “Gazelles” are start-ups that achieve fast and profitable growth, while “zombies” are start-ups that survive but generate little growth and employment, taking up precious resources. Fostering more “gazelles” and weeding out “zombies” are critical in building a truly vibrant and viable tech start-up ecosystem, he noted.

More insights into the study on pages 12-13!



One of the interesting displays: an autonomous drone by AeroLion Technologies



Lively networking that spilled onto the streets of Ann Siang Hill during Urban Experience



(L) Kelvin Tan, NUS SSI Business Head, and Liu Qiong, Tianhe Bureau of Technology Industry and Information Section Chief, hosting the T-Hero International Innovation & Entrepreneurship Competition 2017



One of NUS Enterprise's incubatees, WateROAM, at the Start-up Bazaar



(L) Brian Koh, NUS Enterprise Director, Tan Pek Yew, Panasonic R & D Center Assistant Director and Aylwin Tan, Ascendas-Singbridge Chief Customer Solutions Officer, at the Ascendas-Singbridge Forum on Co-Innovation 2.0



Participants eagerly listening in to the casual-style Kopi-Chats organised by student ambassadors from NUS and other local tertiary institutes, which ran regularly at the coffee zone



L'ORÉAL Innovation Runway

Fancy an opportunity to collaborate with one of the largest and most innovative cosmetics companies in the world? Now is your chance!

NUS Enterprise is partnering with L'Oréal to launch the L'Oréal Innovation Runway startup challenge, alongside Startup SG and SPRING Singapore. Participants can win the opportunity to work with L'Oréal and its regional APAC hubs, gain access to mentors and industry networks, as well as potentially receive S\$5000 cash prizes and a S\$50,000 Startup SG grant.

Challenge Categories:



Novel, Smart Materials



Green Materials



Delivery Technologies



Personalised Beauty



Digital Technologies

Don't miss this opportunity! Visit lorealinnovationrunway.sg for more details.

Organised by:

L'ORÉAL

Key Partner:

STARTUP SG

In Collaboration With:

 **NUS**
National University of Singapore | NUS Enterprise

SPRING
singapore
Enabling Enterprise

AGING UNLIMITED

NUS Enterprise and ACCESS Health Singapore organised the third Modern Aging Symposium on 15 April 2017. Supported by SingHealth, the event brought together entrepreneurs, investors, corporations, students, academics, and policymakers to provide insights on the latest challenges and opportunities in the ageing landscape of Asia.

The symposium's theme, Aging Unlimited, reflects the bountiful opportunities that an ageing Asia offers, with an elderly population that is healthier, savvier, and more energetic than ever before. The programme was packed with many interesting speakers and topics which kept the participants intrigued:

- **Dr. Chow Mun Hong**, Director of Innovation and Quality Management at SingHealth, highlighted areas for innovation and collaboration, particularly in the clinical setting
- **Associate Professor Angelique Chan** from DUKE-NUS Graduate Medical School spoke on productive ageing, changing demographics in Singapore and how it can impact retirement and health
- **Tyco Tat** from Singapore Polytechnic, the lead designer at Innovations for Healthy Ageing (Inno4), shared his experience on how user centric design can solve ageing related problems
- **Adjunct Associate Professor Shamira Perera** from the Singapore Eye Research Institute (SERI) focused on the latest innovations in ophthalmology
- **NUS student Alex Teo** shared his perspective on industrial design for the elderly using his award winning elder friendly and smart lighting device
- The co-founders of both Modern Aging 2016 awardees, **Flexosense** and **Kinexcs**, shared how their entrepreneurial journeys have been thus far



Assoc Prof Shamira Perera sharing insights into innovation in ophthalmology

The symposium also marked the official launch of the third run of the popular Modern Aging business accelerator programme. Modern Aging Singapore is a community, accelerator, and education platform with the objective to create new businesses that help people live better as they live longer. The Modern Aging accelerator programme identifies, develops and scales start-up companies that serve the needs of ageing populations around the world. With the help of industry experts, mentorship, and a business education programme, Modern Aging ensures that its participants are empowered to take their ideas forward.

More information on the programme and videos of the talks can be found on the website - <http://modernaging.sg>

BIG DATA INTELLIGENCE: THE NEXT DIGITAL DISRUPTION

BLOCK71 Singapore launches its very first Kopi Chat deep dive session exploring the applications of big data and artificial intelligence



Speakers from L–R: Tho Lye King (IBM Watson), Lee Jin Hian (Mimetic.ai), Huang Heyu (Fresco Capital), Daniel Lim (GovTech), Henri-Christian Hartloff (Taigar), and Samuel Chua (Moderator)

On 29 March 2017, BLOCK71 Singapore kicked off its first Kopi Chat Deep Dive Series with “Big Data Intelligence: The Evolution of Innovation”. The lively crowd of over 250 attendees were treated to an interesting Kopi Chat session where a panel of experts in the Big Data Intelligence field gave their insights on the nature of Big Data and Artificial Intelligence (AI), including how they drive product development and marketing, and the shifts they expect to see in the landscape within the next decade. The session was also live streamed to over 80 viewers at BLOCK71 Jakarta.

The panel included Dr. Daniel Lim, Data Scientist of GovTech Singapore; Tho Lye King, Platform leader in ASEAN of IBM Watson; Lee Jin Hian, co-founder of Mimetic.ai; Henri-Christian Hartloff, VP Sales of Taigar; Huang Heyu, Senior Associate of Fresco Capital; and Samuel Chua, founder of Metacata, who moderated the session. The speakers delved into presentations explaining how their companies or agencies used big data intelligence in their systems – including coming up with cognitive computing solutions (IBM Watson) and bridging the gaps between IT and government policies (GovTech). This was followed by an interactive Q&A session, where the speakers took questions from the floor.



“Many industries will reinvent itself, and there will be skill sets and businesses that become obsolete, This is where opportunities lie for Big Data and Artificial Intelligence Solutions.”

- Daniel Lim, GovTech



Panel of experts sharing their insights on the topic during the kopi-chat session

The attendees were also introduced to nine Big Data and AI start-ups, as well as our partner Microsoft. The start-ups and Microsoft exhibited their innovative solutions at the Start-up Showcase. One of the start-up products, Savioke’s autonomous delivery robot, made a guest appearance during the chat session, showcasing its utility by bringing the speakers refreshments.

In an age where automation is prevalent, companies must learn to re-invent themselves to survive. If not, they face the possibility of becoming obsolete. While many fear that machines may replace humans, many technopreneurs nowadays strive to use big data intelligence to instead have machines work in cohesion with humans. Through combining computer intelligence with human insights, big data intelligence is not only the next big thing – it is also the future.

INNOVFEST SUZHOU 2017

Gateway to Innovation in China



Singapore and China officials at the opening of InnovFest Suzhou 2017

Organised by the National University of Singapore (Suzhou) Research Institute (NUSRI), Singapore-China (Suzhou) Innovation Centre and NUS Enterprise, the third edition of InnovFest Suzhou took place at NUSRI on 6 and 7 June 2017. Held annually, the event opens up international doorways to exploring China's leading technologies, new innovations and market opportunities by

providing a networking platform for overseas technology owners and start-ups to meet up with Chinese partners, collaborators and VCs.

During the opening ceremony on 6 June, Mr Sean Flanigan, Director, NUS Industry Liaison Office gave an opening keynote address, speaking on technology innovation and the entrepreneurship ecosystem



Attendees visiting the exhibition booths with many interesting products

in Singapore. Mr Flanigan highlighted that Innovfest was part of the University's consistent efforts in helping Singapore start-ups and technologies venture into and initiate collaboration within China.

The two-day event saw more than 800 visitors viewing over 100 projects from countries ranging from Germany, Israel and Japan to Singapore, the UK and the US. Thirty-eight universities, including renowned ones like Beijing University, Oxford University, Shanghai Jiaotong University and The Hong Kong Polytechnic University, participated in the event, as well as multinational companies such as Bosch, Johnson & Johnson and Samsung.

The projects focused on areas such as biomedical devices, intelligent manufacturing and hardware, new energy, environmental protection, water-related technology, and digital new media, among others.

Attendees thronged the four parallel sessions, closed-door pitching, 70 presentations, and 35 exhibition booths featuring a wide variety of start-up projects.

At the event, NUS Enterprise, NUSRI and Ascendas-Singbridge inked a Memorandum of Understanding (MOU) for the establishment of BLOCK71 Suzhou, the newest location in the BLOCK71 network. The Director of the NUS Smart Systems Institute (NUS SSI), Professor Ooi Beng Chin and the Director of NUSRI, Professor Xu Guo Qin, also signed an MOU for the collaboration in China's artificial intelligence market. During the event, SSI



Signing ceremony between NUS SSI and NUSRI

presented high-tech projects like Geovid, Ambiotherm and virtual lemonade which generated much interest from the participants and a great opportunity for exposure.

NUSRI also hopes to evaluate projects and provide business consulting to expedite the process of setting up international high-tech innovation projects in Suzhou.



InnovAlley: Mr. Zhou Xudong communicates with college students who started their own businesses



New energy and environmental protection, water related technology session by Dr. Adil M. Dhalla, Deputy Director of NEWRI (NTU)

SEEKING “GAZELLES” IN SINGAPORE’S TECH ECOSYSTEM

Why gazelles?

In 1994, the economist David Birch coined the concept of “gazelles” to describe high-growth firms that account for a disproportionately large share of job creation in an economy. By Birch’s estimate, gazelles comprised only 4% of all US companies but were responsible for 70% of new jobs. The growth performance of gazelles far outpaced the “elephants” (large, established corporations) and the “mice” (Main Street mom-and-pop shops). Understandably, there has been sustained interest in identifying and studying gazelles among entrepreneurship scholars. Studies using US data confirm that gazelles are the most productive enterprises. They generate more revenue per employee and maintain this advantage even during downturns and recessions.

At Innovfest unbound 2017, Prof Wong Poh Kam turned the spotlight onto Singapore’s tech start-up landscape, in search of home-grown gazelles. His presentation is based on findings from a two-year research project on the growth dynamism of high-tech start-ups in Singapore. With funding from the National Research Foundation (NRF), this study by the NUS Entrepreneurship Centre (NEC) surveyed over 500 Singapore-based tech start-ups to ascertain the state of the landscape, growth performance and trajectories, strategies and key concerns.

A thriving ecosystem for start-ups

Prof Wong began by setting the big picture: start-ups are growing in importance in the Singapore economy. Not only has the number of start-ups doubled in the last ten years, an increasingly large share of nation-wide jobs are created by start-ups, particularly those in the tech services sector.

These numerical gains are due in part to Singapore’s thriving ecosystem for entrepreneurship, which has been lauded globally. The NEC study reports improvements in multiple aspects of Singapore’s ecosystem support infrastructure. Compared to an earlier NEC study conducted in 2010, there is greater financial munificence and government support. Start-ups in 2016 are also more likely to own intellectual property, engage in innovation cooperation and have overseas operations.

High dynamism and survival rates

Singapore also has high levels of firm dynamism when compared to a basket of advanced economies. Firm dynamism is captured by start-up formation and cessation activities that result in “business churn”. Singapore’s firm dynamism profile is one of high business churn and high firm survival rates. Of eleven benchmark advanced economies, Singapore has the highest rate of business churn.

The odds of a Singapore start-up surviving to its fifth year is 53%, compared to 49% in the US and 42% in the UK. This high-churn, high-survival profile suggests an entrepreneurial hub with infrastructure to support young firms. Contrast this with the high-churn, low-survival profile of the US which represents a location with greater risk-taking and potential for disruptive innovation.

“

The job of a good ecosystem is to efficiently weed out non-performing firms and limit the number of ‘zombies’ so that more resources are channelled to those with the potential to become ‘gazelles.’

- Prof. Wong Poh Kam, Director of NUS Entrepreneurship Centre

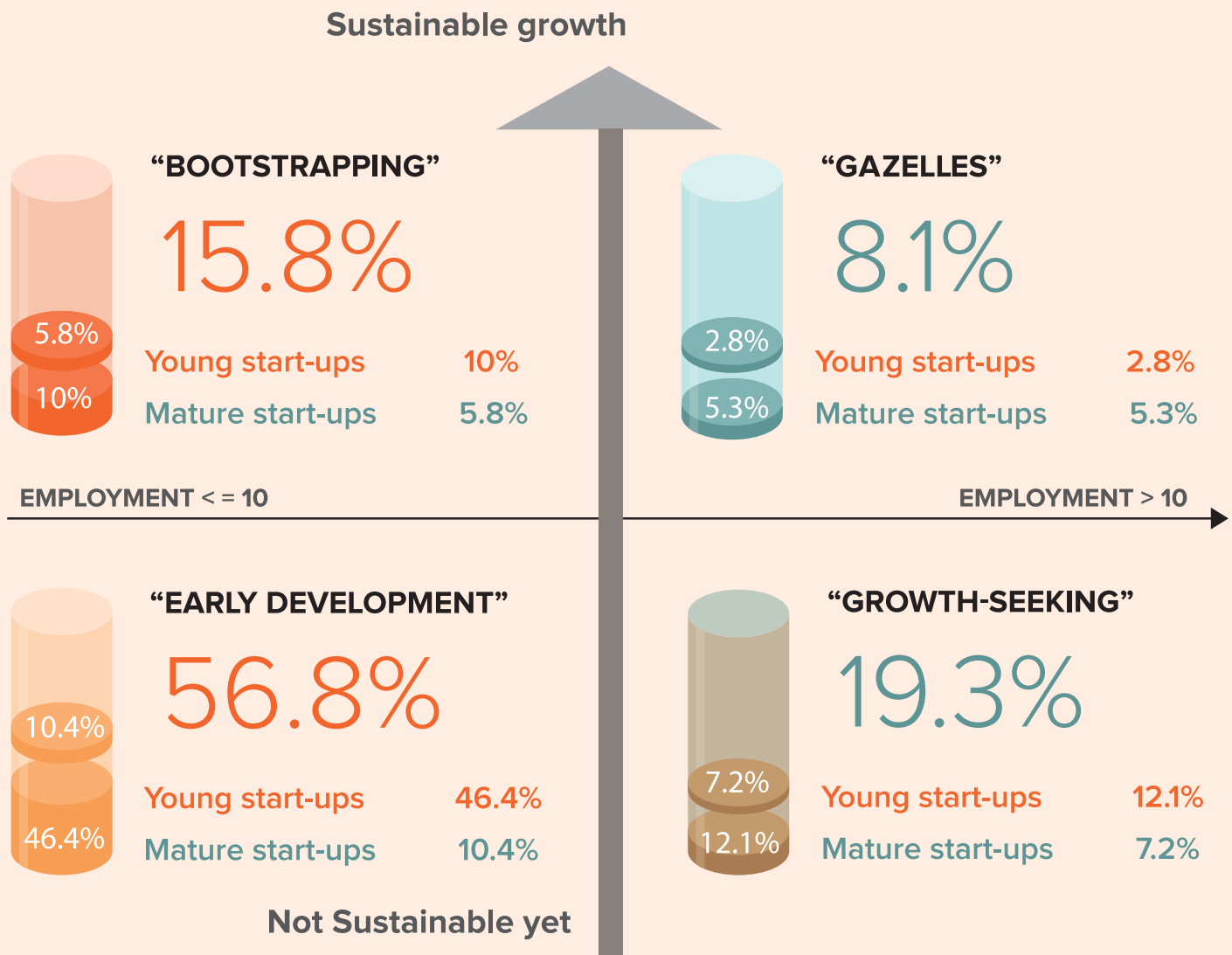
Gazelles vs. zombies

Numbers aside, a truly dynamic tech start-up ecosystem generates great variances in firm performance. Around half the tech start-ups in any given cohort will not survive beyond their fifth year. These non-viable firms either run out cash before being able to generate much growth, or achieve fast growth initially but cannot sustain their performance to reach profitability or be acquired. Of those that survive, the majority will be in the “zombie” category where there is low growth and little by way of job creation. In contrast, there is the rare breed of gazelles that achieve fast and profitable growth. Realistically, only a minority of start-ups will become gazelles. Nonetheless, it should not be left to happenstance. A vibrant tech start-up ecosystem can generate more gazelles by weeding out non-viable firms and reducing the number of zombies.

The NEC study defines gazelles as start-ups that have achieved sustainable growth and employ more than 10 employees. Only 8.1% of the surveyed start-ups are gazelles, with two thirds of gazelles being mature start-ups aged above five years. The majority of start-ups (56.8%) are still in the early development stage, with fewer than 10 employees and yet to achieve sustainable growth. Boot-strapping start-ups which are sustainable but small in size account for 16% of the sample. Interestingly, there is a healthy proportion (19.3%) that are potentially high-growth, known as “growth seekers”.

Gazelles and growth-seekers are high-impact enterprises. They represent only 27% of start-ups but are responsible for 74% of jobs. They also record higher annual sales, averaging SGD 4.1 million for gazelles and SGD 3.3 million for growth-seekers, compared to other start-ups that achieve average sales below SGD 1 million.

TYOLOGY OF TECH START-UPS IN SINGAPORE



Notes: Young start-ups are aged 5 years and younger, mature start-ups aged more than 5 years. Based on n=530 start-ups.

A somewhat less rosy picture emerges when studying the characteristics of Singapore’s gazelles. They have relatively low R&D spending intensity and low propensity to introduce innovative new products. This becomes less surprising upon closer examination which reveals that most gazelles are in Infocomm Technology (ICT) services. Compared to growth-seekers and early-development start-ups, Singapore gazelles are more likely to target mature markets rather than growth and emergent markets.

“Without more deep technology innovations, it’s harder for companies to scale faster.”

- Prof. Wong Poh Kam

Singapore’s tech start-up ecosystem has become more dynamic. However, it is not producing sufficient numbers of gazelles, especially in deep-tech areas, compared to dynamic innovation hubs like the Silicon Valley and Israel. This is suggestive of a more conservative approach here. To boost the number of gazelles, more risk-taking is needed. Investing in areas such as deep technology would increase the likelihood of achieving technological breakthroughs, thus creating start-ups that can scale-up faster. As it is, Singapore’s ecosystem has not tapped into its full potential to birth gazelles.

The executive summary of the NEC study can be downloaded from <https://htsu.techsg.io>

TO **GROW** THE **ECOSYSTEM**, **GROW PEOPLE**

New forms of storytelling through humanising technology was a major theme at Innovfest unbound 2017 as speakers engaged with hot topics in today's start-up community. However, despite changing trends, one building block remains a priority: people.

How can entrepreneurs and ecosystem-builders work together to create a conducive environment for start-ups and innovators alike to flourish? Here are 3 tips we gathered from snippets of conversations at Innovfest unbound.

1 The new face of healthcare is personal.

With an increased focus on data analytics, the tools to monitor one's health is put in the hands of the people. Digital platforms that collect data act as interventions that enable the general public to track and monitor personal behavioural changes on a day-to-day level, observed Holmusk CEO Nawal Roy. This can become a precursor to primary, secondary, and tertiary healthcare.

Yet, in the age that robots and systems can replace people, human connections matter - perhaps even more. People can be replaced, but relationships and empathy are impossible to replicate in the same way, surmised John Lim, Executive Director, Centre of Regulatory Excellence, Duke-NUS Medical School. The same can be said in healthcare, as well as business and the soft parts of building an entrepreneurial ecosystem.

2 Connect through virtual relationships.

Clicks, likes, and comments on social media need to be given a personal touch to get things moving. ABC - Always Be Connecting, said Forbes and Huffington Post contributor Joe Escobedo, who advised participants to craft their emails with a full sense of the reader behind the screen.

Razer CEO Tan Min-Liang models being a good listener online by consistently gathering real-time feedback from his customers through his personal Twitter. Online communities can have as significant an impact as offline ones in generating trust, camaraderie, and results by sustaining online conversations.

3 Keep updated: understand the next generation.

Gen-Z, parents, employers, and product designers alike were curious about how to engage and invest in the next generation of employees, founders, and children.

The last generation was about survival, 99.co CEO Darius Cheung observed; this generation is about meaning. Generation Z (born 1995 or later) was an oft-discussed topic on panels. How do we get their attention? Be authentic, said Kobe founder Evangeline Leong, who engages millennial ambassadors around the world. With the range of brands that seek to grab their attention on Snapchat and Instagram on an hourly basis, they are careful about who to trust. At the same time, take care not to mollycoddle them, said Mediacorp Head of Commercial Planning and Solutions Dasheng Toh, giving an analogy to strawberries that died with too much water and supervision. Love them or hate them, this generation is here to stay - and are likely to set the pace for entrepreneurship and innovation for the next decade as consumers and creators.

The message to digital natives was clear: continuous learning is a must. With the rate of change - what is assumed to be wrong today could be right tomorrow. The bottom line: the ecosystem is made of people. To grow the entrepreneurship ecosystem, growing people must be a consistent priority.

5 QUESTIONS WITH TINYMOS



(L) Chia Lih Wei (CTO), Ashprit Singh Arora (COO), Grey Tan (CEO), Raphael Goh (Marketing & Design)

NUS alumni start-up TinyMOS has invented the world's first tiny astronomy camera. We spoke to Chia Lih Wei, the CTO of TinyMOS, to find out more about the camera that's out-of-this-world

1. What is TinyMOS and what makes it special?

TinyMOS specialises in making astronomy accessible to everyone. Our vision is to create a larger astronomy community and to promote exploration of space and astronomy from the ground up. Our first product, the Tiny1, is a camera that aims to be the first step in this movement. What makes the camera special compared to ordinary cameras is that we have a star-overlay system that allows anybody to identify the specific astronomy object they're pointing at, or to search for a specific feature and be led by the camera to point in the right direction. We hope this simplification of a field traditionally accessible to academics and professionals will encourage more people to explore the stars and be interested in space.

2. How did the team behind TinyMOS come together?

TinyMOS's story started with a university module, TR3001 New Product Development taught by Prof. Neo Kok Beng. The company's product idea is Grey's brainchild. He had been a photographer for the past 4-5 years, and when he took a NUS Physics class that required students to do a write-up about a celestial object, few of the students chose to use the provided telescopes to photograph their chosen object. Instead, they opted to download photographs of said objects from the internet. During the TR3001 course, Grey suggested a product that could revolutionise the way people take pictures of the sky and make astronomy accessible to everyone. Grey and Ashprit thus met as teammates during the course. It was during the final months of my NUS Overseas Colleges (NOC) stint in Silicon Valley when Grey told me of his idea. After the semester, I was brought on board to help develop the technical aspects of the project and the first few prototypes!



To many, beyond the promise of fame and fortune, working on a start-up may seem like a masochistic approach to life. But to an entrepreneur, he or she is dedicating their life to realise a cause they deeply believe in."

- Chia Lih Wei, CTO, TinyMOS



TR3001

3. What's the biggest takeaway you had from NOC?

The crux is a difference in perspective gained working on a start-up. Beyond all the dreams of exit and fame, the biggest reason an entrepreneur starts a company is because he believes in the cause. I was extremely lucky to have been paired with a company in Silicon Valley whose vision and product I firmly believed in, and between that work and the knowledge imparted by the classes I attended, I learnt what it meant to be an entrepreneur.

4. Were there any challenges you faced along the way?

Building the hardware itself was undoubtedly the most challenging, since we were pushing several technical boundaries. We had vendors that just outright told us that they would not support us, or gave up half-way. But we pressed on and kept finding other avenues of support. Grey's mantra on getting investments and help is the phrase "always talk to people". As with most pre-series-A stage start-ups, all but a few of the investors we'd talk to would reject us, making it easy to lose motivation. We were lucky to eventually find the right ones to support us at almost every checkpoint in our journey. I think this has helped keep us going on the numerous days when the company's investment future seemed bleak.

5. What are your plans for the future?

We plan to be the go-to camera brand for space and exploration, by opening up a new market through easier access. Astronomy imaging will be simplified by TinyMOS, similar to how digital cameras simplified photography for the everyday person. After the Tiny1, we will be releasing a wider product range targeting people with different skill levels and preferred use. There are many other exciting things we have planned, such as feature apps, add-on accessories, astronomy planners, and data analytics for astronomers. We're even thinking of sending our camera into space! (How cool is that!)

FROM CREATING A GAMING MOUSE TO BUILDING A CULT BRAND

“It doesn’t make a difference how large the company is, it’s all about being passionate about what you do, and what you build. It’s all about making sure that you build a great product all the time, for your users, constantly, and over-deliver on it, and the rest will come.”

-Tan Min-Liang, CEO of Razer, NUS Law alumnus



Razer CEO and lawyer-turned-entrepreneur Tan Min-Liang, speaking at Innovfest unbound 2017

At Razer, they do two simple things: hardware and software. While there are about two billion gamers over the world, gaming is still very much a niche market. So how did Razer manage to amass such a large following of ardent fans – with one even tattooing Founder and CEO Tan Min-Liang’s name onto his arm?

Always Keep In Line With the Motto

“Our focus has always been a single line – for gamers, by gamers.” A phrase commonly mentioned by Min-Liang, Razer is run with the same stubborn adherence to creating what gamers want and need. By sticking to their mission of catering to the wishes of gamers, this also means that they need to take on several less profitable projects. For example, despite having no way to ever recoup the losses, Razer created a left-handed mouse as the company wants to give its consumers as many choices as possible. Min-Liang believes that if they build something truly great, the gamers will appreciate it.

Find a Niche...and Scale

Compared to big brands like Apple and Samsung, Razer has always been serving the relatively niche market of gaming-centric products. While they have found much success since their inception in 2005, their early days saw a lack of investors. Many VCs pressed them to look at a bigger total available market (TAM) for gaming peripherals. However, their passion for building something they believed in led them to instead continue focusing on a niche, and building on the very best products and services for the niche. Twelve years later, they have become one of the biggest game brands globally.

Find Talent, Anywhere in the World

Many founders lament not being able to find talent. For Min-Liang, saying that a particular country lacks talent is ridiculous. Businesses are global, hence development teams can be too. He believes that there is phenomenal talent everywhere, and the many offices set up around the world are just ‘(housing) the talent (his company) can find’. With over 1,000 staff and counting in nine offices around the world, Razer doesn’t wait for talent to knock on their doors – they go to where the talent is, reach out to it, and cultivate it.

Always Speak Directly to your Customers

Rather than connect with fans at a detached level by dishing out press releases, Razer believes in being present where the consumers have a large presence – on social media platforms. They also built their own channel, Razer Insider, to allow fans to interact with each other (including Min-Liang) on the forums. Min-Liang himself isn’t one to shy away from interacting directly with fans on his social media accounts. He revealed that not only does this approach make his customers feel engaged 24/7, it also gives him an insight into what fans think, and what they want, serving as a very effective source of feedback. In the long run, this strategy helps to further strengthen the ties between brand and consumer as it becomes mutual.

“Remember, you are not building your start-up for VCs or KPIs, you are building your start-up to build something truly, truly great.”

-Tan Min-Liang



AMBIOTHERM

Virtual Reality's goal is to transport you to other worlds and make the illusion as convincing as possible. However, most devices currently provide only visual and auditory stimuli. Researchers from the National University of Singapore believe VR shouldn't just cater to sight and sound. To enhance the immersion in VR, your other senses should come into play as well.

HOW IT WORKS

Created at the National University of Singapore, Ambiotherm is an accessory that clips onto existing Head Mounted Displays. The front section boasts two fans mounted on a servo-motor, while a temperature module attaches to the back of a user's neck to simulate ambient temperatures (heat or cold). Both thermal and wind effects are controlled using a microcontroller that receives commands from the headset via Bluetooth.

A WHOLE BODY EXPERIENCE

By utilising thermal and wind effects cleverly in combination, it's possible to simulate complex VR experiences. Various experiments have shown that gradual application of each module can mimic how the whole body would actually feel if, for example, the wearer was walking through a desert under the scorching sun or skiing down a snowy mountain slope. This innovation can be used to provide truly immersive VR experiences, for example when simulating environmental conditions in gaming applications.

CURRENT AND FUTURE PLANS

A team at the NUS Smart Systems Institute (SSI) in partnership with the Keio-NUS CUTE Center has developed a prototype that was on display during Innovfest unbound 2017. The research team at SSI are currently looking for partnerships with hardware and VR-related companies, to bring this idea to the market. Next up on their checklist is amping up the VR experience via smells and vibrations, as well as learning how human emotion can be augmented and applied to multi-sensory VR.

Video showing prototype in action:

<https://youtu.be/5E1lvA1Z2mw>

Invented by: Dr. Nimesha Ranasinghe, Pravara Jain, David Tolley, Shienny Karwita Tailan, Prof. Ellen Yi-Luen Do

3D PRINTING REVOLUTIONISING THE HEALTHCARE SECTOR



Panelists sharing opportunities in 3D printing for the healthcare sector

With advances in medicine, 3D Printing has taken centre stage in pushing the frontiers of and bringing numerous benefits and solutions to the healthcare sector. This rapid expansion is expected to revolutionise how medical experts deliver healthcare across all disciplines and levels.

To this end, on 27 May 2017, the NUS Centre for Additive Manufacturing (AM.NUS) and Creatz3D jointly organised the 3D Printing in Healthcare Symposium, supported by NUS Enterprise and National Additive Manufacturing Innovation Cluster (NAMIC).

More than 90 clinicians, healthcare professionals and academics attended the Symposium, with the event covering a wide range of topics, including 3D Printing in knee surgery revision, surgical practices, congenital heart diseases, reconstructive surgery and individualised prostheses.

Clinicians had a good opportunity to gain insights into the customisation and personalisation of medical devices and surgical planning, increased cost efficiency of high-mix low volume devices and enhanced productivity through increased success and minimising revisions.

A panel discussion brought together medical professionals from the various healthcare clusters in Singapore to delve into the current state of 3D Printing in healthcare and how healthcare professionals can get started.

With the advent of 3D Printing, clinicians can actively employ this technology to both aid and improve current practices as well as discover new methods and solutions in an effort to improve patient outcomes.

The Space Apps Challenge is NASA's annual hackathon that aims to address global needs applicable to both life on earth and life in space. This year, three of our NUS Overseas College (NOC) New York students (Ben, Zheng Yu & Sze Ying) joined the challenge and were awarded the "Most Inspirational Hack" for their brilliant solution – WillYouDie.

WillYouDie is a web application that reduces flight anxiety by allowing passengers to follow a real-time visualisation of the safety of their flight. Not only are users able to view real time data on terrain, ecosystem, population and urban value, the application also computes the probability of one's survival in the event of a plane crash, as well as the crash's impact on the city and ecosystem around the crash site.

What served as the inspiration behind "WillYouDie"?

The Space Apps Challenge had multiple pre-determined challenges, out of which we chose one called "Pilots Plus". The challenge encouraged hackers to build a product for educating flight passengers on the places of interests that they were flying over. While discussing, we digressed to talk about flight anxiety, and realised that what we really cared about was our chances of survival if our flight were to crash at any point. After doing some research, we discovered that flight anxiety was a huge problem in the United States –



TAKING ON A SPACE CHALLENGE

NOC New York students win "Most Inspirational Hack" with their out-of-this-world solution at the 2017 Space Apps Hackathon by NASA



The Winning Team (L - R): Benjamin Aw (NOC), Leow Zheng Yu (NOC), Ting Sze Ying (NOC), Lim Sungok and Tom Lavenziano.

20.8 million people (including pilots!) in the country suffer from flight anxiety.

How did the team come about and what roles do each of you take on?

We (Ben, Zheng Yu & Sze Ying) planned to go to this hackathon together, and met two other developers (Sungok & Tom) who were interested to join our team. Ben was in-charge of data collection and the overall pitch, while the rest of the team worked on developing the product.

Did anything interesting/funny happen while in New York or while working on the project?

The judges at Space Apps were extremely amused that we took such a morbid twist on the original challenge!

Do you have any plans on furthering WillYouDie?

We definitely think that this will be a fun project to work on, and might be working on a Chrome extension to bring flight safety ratings to you while you are booking your flights. Stay tuned!

Who is one interesting entrepreneur you met and why was he/she interesting?



Lim Jia
NOC Lausanne
Faculty of Engineering
(Industrial Systems Engineering and Management)

Tej Tadi. He is the sole founder of MindMaze, the world's leading Neurotechnology startup, yet one of his beliefs is to fail fast! This is because he believes in intelligent failure. As he faced numerous setbacks and lessons while working on his start-up, he also advised that it was important to seek help fast and as much as possible.



Jonathan Yeo Tun Seng
NOC Beijing
Faculty of Science
(Quantitative Finance)

The founder and CEO of the online insurance platform 开心保, Jack Li Jie. What's interesting is that even though he had never met me before, he accepted my random WeChat friend request and was so open and willing to help. He even told me the company's history, achievements, how he got his first customer pool and the obstacles the company needs to face in the future. Chinese entrepreneurs are very open for partnership, don't believe in hierarchy and they are very willing to help people, especially youth.

3 Tips for aspiring entrepreneurs

Benjamin: Stay focused with your goals, take the initiative to learn and put yourself in uncomfortable situations - for that's when the best learning opportunities come knocking.

Sze Ying: Be prepared - come up with goals that you want to achieve on NOC before you even leave Singapore. One year is way too short a time!

Zheng Yu: Go for hackathons, fireside chats, start-up weekends, pitch competitions etc. Because that's where magic happens.

Stay updated on our upcoming events at:
enterprise.nus.edu.sg/events

| | APR | | MAY | | JUN |
|----|--|-------|---|-------|---|
| 01 | NOC Connection (Homecoming) | 02 | Launching into China - Q&A session | 01 | IoT with XDK – Cross Domain Development Kit-Bosch Connected Devices and Solutions by Frederik Tröster |
| 03 | Philip Yeo Innovation Fellows Programme MAD Talk | 03-04 | Innovfest unbound 2017 | 05 | Smart Port Challenge |
| 05 | Workshop: Future Workplace by Carol Wong | 06 | Workshop: A Purpose-Driven Approach to Business Model Design by Prof. Wong Poh Kam | 07 | Kopi-Chat with Asia-Pacific Investment (JV of Rocket Internet & Ooredoo Group) and Vaniday |
| 06 | IoT with Talend – Integrating real-time data streams with Spark and Kafka | 11 | Blockchain + IoT with Freshurf and IBM | 16 | PR101 – PR Strategy for your start-up |
| 06 | An Afternoon On Fintech by Eamon Keaveny | 12 | Digital Marketing Bootcamp (Day 2) | 17-18 | AngelHack Global Hackathon Series: Singapore |
| 07 | Microsoft Biz Talk – How do we achieve 13,000 users without spending marketing dollars? | 13-14 | #Bot Hackathon | 23 | Morning Pitch Singapore – Mobility |
| 15 | Modern Aging Symposium: “Aging Unlimited” | 17 | NOC 101: Basic HTML & CSS Designed for Innovation 3: Learning from the Quest | | L’Oréal Innovation Runway Startup Challenge Roadshow (BLOCK 71) |
| 20 | Girls in ICT Day (Singapore) | 18 | Entrepreneurial Link: Singapore x Portugal | 28 | L’Oréal Innovation Runway Startup Challenge Roadshow (Impact Hub) |
| 26 | Kopi-Chat – The importance of Brand Building for Start-ups by Stew Langille Artificial Intelligence and The Future of Recruitment | 19 | Kopi-Chat with Mike Clapson | 29 | Cleantech Global Call: Air, Water, Sound launch |
| | | 25 | Doing-IoT: remoteEye Preview | | |
| | | 27 | 3D Printing in Healthcare Symposium | | |
| | | 29 | Singapore x Myanmar | | |
| | | 31 | Machine Learning & AI for Services Eye-on-Ai: Cognitive Sandbox Roundtable | | |

THE NUTS AND BOLTS ON **HIRING** AND **FIRING**



In June 2017, NUS Enterprise organised a Founder’s Breakfast at BLOCK71 Singapore, where entrepreneurs got together to discuss key challenges in the area of hiring, firing and building the right corporate culture. Here are some of the interesting take-aways from this session.

What are some of the difficulties start-ups face when it comes to hiring?

- Tech start-ups need people with specialised skills and getting such staff is difficult, especially when start-ups cannot pay top salaries. Start-ups should put in place an employee stock options plan (ESOP), in order to attract good staff and encourage loyalty.
- When a start-up makes its first few hires, it typically gets good generalists - individuals that can do a bit of everything. As the company grows, people’s skills will get more specialised. The entrepreneur must find and build up the core strengths of their early hires, otherwise they risk making good generalists redundant.
- First-time employers may not have much experience in hiring and judging character. While the skill sets of the candidate are important, more crucial is the individual’s integrity and whether the chemistry with the co-founders is right.

How do you fire someone?

- Two-way communications with employees is important. All staff should know their key performance indicators (KPIs). Those who are not delivering should be given a chance to improve their performance. In some cases, the employee may work with the entrepreneur to decide together on the deliverables. If after sufficient time, it is clear that the employee does not have a good fit with the company, then entrepreneurs must let them go.

- When it comes to firing someone, do it with dignity and respect. In the ideal situation, after the firing is done, the employer should be able to still ask the individual out for a drink. Remember, it is a small world. Today’s fired employee could be your customer tomorrow.
- Make sure all the paperwork is in order, to keep the company protected. This is especially in situations where the firing is related to the individual’s integrity issues. The company must have the evidence complete, and in a written format. You may be asked to give a character reference in a few years’ time, so having the necessary information available is important.

How to sustain the corporate culture as new hires come onboard?

- It may be better to hire in stages, rather than bring on many new recruits at the same time. Each new employee brings his/ her personality into the company. If hiring is done too aggressively, the co-founders may not have enough time to shape the corporate culture, as they want it to be.
- The start-up culture could end up burning people out. Conserve your human capital, to get the most out of your employees. For example, if staff are not needed in a meeting, allow them to skip it. If all work is completed, let staff go home at 3pm. Next week, you may need them to work until 10pm.